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MEGGER BATTERY TEST EQUIPMENT



1

BITE3 Battery Impedance Test Set

- Cell by cell evaluation
- Determines the health of lead-acid batteries up to 2000 Ah
- On-line testing with Pass/Warning/Fail calculations
- Measures impedance, intercell connection resistance, cell voltage



2

BITE2 and BITE2P Battery Impedance Test Sets

- Cell by cell condition evaluation
- Determines the condition of lead-acid and NiCad batteries up to 7000Ah
- On-board Pass/Warning/Fail indications
- On-line testing



3

Digital Hydrometer

- Measures specific gravity and temperature
- Follows IEEE 450 recommended practices for specific gravity checks
- Memory for eight tests of up to 256 cells each
- One hand operation



4

Battery Ground Fault Tracer

- Easily locates ground faults on in-service DC battery systems
- Operates in high electrical noise environments
- Simplifies fault tracing by identifying fault characteristic magnitudes (resistive and capacitive)



5

Battery Ground Fault Locator

- Easily locates ground faults in ungrounded DC battery systems
- Battery-operated
- Automatic bridge simplifies fault tracing by identifying fault characteristic magnitudes (resistive and capacitive)



6

BVM Battery Voltage Monitoring

- Automates battery voltage measurement during capacity tests
- "Daisy-chain" design allows expandability up to 120 units
- High accuracy and stability for precise data collection
- Integrates PowerDB Test Data Management software



7

TORTEL 840/860 Battery Load Units

- Battery banks can be tested "in service" or off-line
- Unit uses battery load and provides regulated load to meet test parameters
- User adjustable alarm and shutdown points to avoid excessive discharge
- Easily expandable for larger battery banks using TXL extra load units



8

TXL870 Extra Load Accessory for TORTEL units

- Intended for 125-250 V systems
- Designed for use together with Torkel Battery Load Units
- Provides higher load current for use in constant current or constant power test
- Automatic shut down



MEGGER INSULATION RESISTANCE TEST EQUIPMENT



9

5kV S1-552/2

- 5 mA high charging current for testing large generators and cables
- 15 T measurement range
- CAT IV 600 V rating
- Extended operating temperature (-20° C to +50° C)



10

5kV S1-554/2

- An industry best 4 mA noise rejection
- 5 mA high charging current for testing large generators and cables
- 15 T measurement range
- CAT IV 600 V rating



11

10kV S1-1052/2

- 5 mA high charging current for testing large generators and cables
- 35 TΩ measurement range
- CAT IV 600 V rating
- Extended operating temperature (-20° C to +50° C)



12

10kV S1-1054/2

- An industry best 4 mA noise rejection
- 5 mA high charging current for testing large generators and cables
- 35 TΩ measurement range
- CAT IV 600 V rating

MEGGER HIGH-VOLTAGE INSULATION TEST SET



13

70kV, 120kV and 160kV DC Dielectric Test Sets

- Light weight air-insulated design
- Separate high-voltage module for maximum operator safety
- Filtered half-wave rectification matches performance of high priced full-wave rectification sets

MEGGER OIL TEST EQUIPMENT



14

OTS60PB, 60 kV Portable Oil Test Set OTS80PB, 80 kV Portable Oil Test Set OTSAF Series, 60 kV, 80 kV and 100 kV Automatic Laboratory Oil Test Sets

- Lightest - minimum weight 30 lbs - portable instruments for measuring insulating oil breakdown voltage
- Lock in precision - oil vessel with lockable adjustment
- Bright 3.5 inch color display visible outdoors
- Suitable for mineral, ester and silicon oils

MEGGER POWER FACTOR TEST EQUIPMENT



15

NEW DELTA4000 10-kV Automated Insulation Test Set

- Industry's Lightest multi-piece design at 36kg (14+22)
- Industry Leading Functionality with built-in Individual Temperature Correction (patent pending); Automatic Non-Linear Detection (patent pending); Automated measurement with PowerDB Software and Manual Control for customized testing.
- Industry Leading Frequency Range (5-500Hz)
- Built-in Analysis & Trending tools with PowerDB Software



DELTA4110 test set is to be used with an external computer (not included).



DELTA4310 test set comes with an onboard computer.



PRIORITY ACCESS provides guaranteed technical and product support services to maximize your investment in Megger Test Equipment.

- Expert Technical Assistance
- Annual On-Site Training
- Engineering Consultation & Results Analysis
- 24/7 Telephone Support
- Maximize Uptime
- Expedited Repair Services
- Loaner Units & Standard Accessories
- Keep Pace with Industry Practices & Trends

Contact us at priorityaccess@megger.com for more information

MEGGER POWER FACTOR TEST EQUIPMENT ACCESSORIES



16

Capacitor Kit

Includes carry case, TTR capacitor (left), and 2 reference capacitors (center). Also shown are 2 connectors (right) that will work with the capacitors and are supplied with the Power Factor (C&DF) Test Sets.



17

Accessory Kit

Includes mini bushing tap connectors, hot collar straps, temperature/humidity meter, .75" bushing tap connector, 1" bushing tap connector, "J" probe bushing tap connector, 3-ft non-insulating shorting leads, 6-ft non-insulating shorting leads.



18

Oil Test Cell

Used for testing insulating fluids up to 10 kV.



19

Resonating Inductor

Expands the range of Power Factor (C&DF) Test Sets.



20

Calibration Standard

Traceable to the NIST for quick operating or calibration checks of test sets calibrated in watts loss or in dissipation factor.



MEGGER TRANSFORMER TEST EQUIPMENT



21

TTR25, Basic Hand-held TTR Turns Ratio Test Set

- Extremely light at a mere 1.9 lbs
- Simple, push-to-test operation
- Measures turns ratio from 0.8 to 20,000:1 and excitation current up to 100 mA
- Made of durable ABS plastic



22

TTR100, Advanced Hand-held TTR Turns Ratio Test Set

- Most accurate with highest turns ratio in a hand-held TTR in the industry
- Lightweight (3.3 lb) and robust; ideal for field and substation environments
- Measures turns ratio of power, distribution transformers, and regulators, single and three phase (one phase at a time), as well as PTs and CTs



23

Single-Phase, Hand-crank TTR Turns Ratio Test Set

- Megger still offers its rugged and reliable Hand-cranked TTR for measuring turns ratio up to approximately 330:1.



24

TTR330 3-Phase Transformer Turns Ratio Test Set with "PowerDB ONBOARD"

- NEW - Transformer vector recognition
- Fully automatic operation (stand-alone or remote-control)
- Integrated PowerDB ONBOARD allows for data analysis and trending while still in the field
- Built-in USB port and optional USB printer allows for 8.5" x 11" test forms printing without the use of a laptop
- Built-in capability for storing test results, in an open XML format, to either internal memory or to an external USB storage device



25

TTR310 3-Phase Transformer Turns Ratio Test Set

- NEW - Transformer vector recognition
- Text-based LCD interface unit
- Replaces the 550503 TTR
- Fully automatic operation (either stand-alone or remote-control)
- Field upgradeable to a TTR330 or TTR320 without compromise to calibration



26

TTR300 3-Phase Transformer Turns Ratio Test Set

- NEW - Transformer vector recognition
- Remote controlled "black box" unit
- Field upgradeable to a model TTR310, TTR320 or TTR330 without compromise to calibration
- Built-in capability for storing test results into internal memory in an open XML data format via PowerDB LITE
- Quickly download test results via RS-232 serial port

MEGGER TRANSFORMER TEST EQUIPMENT



27

MLR10 10 Amp Leakage Reactance Tester

- Measures the short circuit impedance of transformers
- Useful in detecting and diagnosing winding deformation
- Capable of performing measurements in single- or three-phase transformers
- Optional capacitor bank testing



28

FRAX 101 Sweep Frequency Response Analyzer

- Smallest and most rugged FRA instrument in the industry
- Highest possible repeatability by using reliable cable practice and high-performance instrumentation
- Fulfills all international standards for SFRA measurements
- Highest dynamic range and accuracy in the industry



29

FRAX 150 Sweep Frequency Response Analyzer

- Highest dynamic range and accuracy in the industry
- Built-in PC with powerful backlit screen for use in direct sunlight
- Highest possible repeatability by using reliable cable practice and high-performance instrumentation
- Fulfills all international standards for SFRA measurements



30

MTO210 Transformer Ohmmeter - Winding Resistance and Tap-Changer Test Set

- Direct 2-channel digital reading (1 m to 2000)
- DC test current up to 10 A maximum
- Patented "Quick Test" measurement technique
- 0.25% measurement accuracy



31

MTO330 Automated Six-Winding Transformer Ohmmeter

- One-time connection principle results in a 4x faster setup time eliminating over 70% of safety risk*
- Automated eight-terminal/six-winding measurement capability
- Interchangeable lead set with the Megger 3-phase series of TTRs
- Simultaneous winding magnetization for fast and accurate dc winding resistance measurements of high inductive loads



32

MCT1605 Multi-Tap Automatic Current Transformer Saturation, Ratio and Polarity Test Set

- One button automated test: Demagnetization, on multi-ratio CTs test all Knee Point, Saturation, Polarity and Deviation, Winding Resistance, Insulation Resistance, and Burden
- Displays multiple instantaneous Saturation Curves with Knee Point
- Integrated 1 kV DC insulation test system
- Color daylight viewable graphical display

MEGGER TRANSFORMER TEST EQUIPMENT



33

IDAX 300 Insulation Diagnostic Analyzer

- Fast and accurate moisture assessment in power transformers
- Reliable results at any temperature
- Automated analysis of moisture content and oil conductivity — decisions at your finger tip
- True frequency domain measurement for highest noise immunity



34

VAX020 High Voltage Amplifier

- Separate high voltage amplifier enables capacitance and dissipation factor measurements at 2 kV test voltage
- True and proven DFR/FDS technology for highest performance
- Large frequency range, DC to 1 kHz
- Compact design, weight < 5 kg

The Megger Current Transformer test sets are lightweight, portable instruments for performing saturation, ratio and polarity tests on current transformers using the IEEE C57.13.1 method. Tests are performed automatically and CT nameplate information can be easily entered using the QWERTY keyboard. Test results are displayed on the bright color screen and can be saved to either internal memory, or to an external USB memory stick.

TYPES OF TRANSFORMER TESTS			
Component		Megger Instrument	
Windings	Resistance	MTO	
	Ratio/polarity	TTR	
	Excitation current	DELTA	TTR
	Short-circuit impedance	FRAX	MLR
	Frequency response analysis	FRAX	
	Insulation resistance	S1	
	Capacitance	DELTA	IDAX
	Power factor/tan delta	DELTA	IDAX
	Dielectric frequency response	IDAX	
Bushings	Capacitance	DELTA	IDAX
	Power factor/tan delta	DELTA	IDAX
	Dielectric frequency response	IDAX	
Insulating oil	Dielectric strength	OTS	
	Power factor/tan delta	DELTA	IDAX
Cellulose Insulation	Moisture content	IDAX	
Tap Changers - Load	Contact/winding resistance	MTO	
	Ratio	TTR	
Tap Changers - De-energized	Timing (make before break)	MTO	
	Contact pressure (resistance test)	MTO	
	Ratio	TTR	
Core/Tank	Insulation resistance	MCT	S1
	Frequency response analysis	FRAX	IDAX
	Ground test	MoM	DLRO



MEGGER MEDIUM AND HIGH VOLTAGE CIRCUIT BREAKER TEST EQUIPMENT



35

TM1800 Circuit Breaker Analyzer

- Modular based design – user configurable TM1800 from nine different modules
- Built in PC with CABA Local software – advanced testing with predefined breaker test plans (templates), onsite measurement view and analysis
- Dual ground testing using DCM module – increased safety with both sides of breaker grounded
- Graphical results for quick interpretation – timing and motion measurements, coil currents



36

TM1600 Circuit Breaker Analyzer

- The TM1600 is a modular instrument and can handle breakers with up to 12 main contacts and 12 resistive contacts
- Transducers are compatible with EGIL and TM1800 Instruments
- Uses same CABA Win software platform as used with EGIL and TM1800
- Base unit without motion capability is 14lbs., Motion Module adds 2.4lbs.



37

EGIL Circuit Breaker Analyzer

- Measures timing and travel of medium and high voltage breakers
- Tests three-phase breakers up to 240kV
- Dual-function timing channels for main and pre-insertion resistor contacts
- Extremely reliable and easy to use



38

SDRM201 Static/Dynamic Resistance Measurement Accessory for EGIL

- Enables resistance measurement on circuit breakers
- Small and light weight
- A number of operations can be run with short waiting intervals



39

SDRM202 Static/Dynamic Resistance Measurement Accessory for TM1800/EGIL

- Enables resistance measurement on circuit breakers
- Small and light weight
- A number of operations can be run with short waiting intervals



40

OCR-8015 Automatic Oil Circuit Recloser Test Set

- 15 kVA, high-capacity output
- Tests virtually all reclosers
- Includes PowerDB Software

OCR-9150 Automatic Oil Circuit Recloser Test Set

- 50 kVA, high-capacity output
- Tests virtually all reclosers
- Includes PowerDB Software



The DualGround™ symbol certifies the use of groundbreaking technology and methods that enables a safe, fast and easy workflow with both sides grounded throughout the test.

MEGGER LOW-VOLTAGE CIRCUIT BREAKER TEST EQUIPMENT



41

B10E AC/DC Voltage Power Supply

- Reliable and stable power supply for circuit breaker testing
- Continuously variable 24-250 V AC or DC output
- Separate outputs for close coil, trip coil and spring charging motor voltage
- Direct triggering for minimum trip voltage testing



42

Vidar Vacuum Interrupter Test Set

- Tests the integrity of vacuum interrupters quickly, safely and easily
- Six voltage settings (includes one user defined selection)
- Extensive voltage range
- Follows ANSI/IEEE standardized DC test methods



43

DDA-1600, DDA-3000 and DDA-6000 Manual and Automatic Circuit Breaker Test Sets

- Digital signal processing technology
- Variable firing angle and pulse duration
- Compliant with NEMA AB-4 test guidelines



44

PS-9116, PS-9130 and PS-9160 Manual and Automatic Circuit Breaker Test Sets

- Provides automatic control of the test set
- Extremely rugged and tests a wide range of circuit breakers
- Test results printout capability



45

ODEN AT Primary Current Injection Test Set

- Simplifies all types of switchgear and CT commissioning, ground grid, circuit breaker testing and more
- Modular design permits optimal user configuration of output current vs. unit size
- Compact transport cart facilitates portability into switchgear rooms with limited space
- Unique I/30 function allows the current to be pre-set using low current to prevent test sample heating



MEGGER LOW-VOLTAGE CIRCUIT BREAKER TEST EQUIPMENT



46

INGVAR Primary Current Injection Test System

- Most Advanced Primary Current Injection Test System to simplify all types of switchgear and CT commissioning, ground grid, circuit breaker testing and more
- Up to 5000 A output current
- Two units, each of about 20 kg (44 lbs), simplifies transportation
- Unique I/30 function allows the current to be pre-set using low current to prevent test sample heating, thus eliminating corruption of test result



47

CB-360-DC Circuit Breaker Test Set

- Capable of testing electromechanical or thermal-magnetic trip devices with dc current
- Digital timer
- Higher current output up to 30,000 Amperes



48

CB-832 Circuit Breaker and Overload Relay Test Set

- Digital memory ammeter and multi-range timer
- 1800 A maximum current output (through a typical breaker)
- Solid-state output initiate circuit
- Lightweight and portable



49

CB-845 Circuit Breaker and Overload Relay Test Set

- Digital memory ammeter and multi-range timer
- 5000 A max current output (through a typical breaker)
- Solid-state output initiate circuitry
- Lightweight and portable



50

MS-2A Circuit Breaker and Overcurrent Relay Test Set

- Light Weight, Portable Primary Injection Test Instrument
- Overcurrent Relay Testing
- Ground Fault Performance Testing for NEC 230.95
- Circuit Breaker Testing

MEGGER DATA COLLECTION & DATA MANAGEMENT SOFTWARE



Data entry and automated control of a Megger TTR instrument.



On-the-fly trending of any test point. Historical values are shown in blue with connecting lines. Values for similar equipment are shown in red. A table above the trend chart lists all of the data values, along with the test date and equipment location.




Results ordering and print dialog form. Generating customized reports for a group of tested equipment is done in one simple step.

51

PowerDB Software

- Synchronize all of your test records into a single corporate database
- Reduce test time
- Improve data integrity
- Track and manage your NERC PRC-005 data and test schedules
- Easily use historical trending for evaluation of test results
- Eliminates the need to install and maintain a software application per instrument
- Use or modify one of our hundreds of built-in test forms
- One step procedure to generate test reports with table of contents and deficiency summaries
- Custom integrations available with CMMS systems such as Maximo or SAP

	PowerDB Version			
	ONBOARD	LITE	ADVANCED	PRO
 COMPARISON GUIDE				
Runs in a hardened embedded environment	■			
Navigate with arrow and enter keys (no mouse)	■			
Manage data files with internal drive and USB drive	■			
Uses a subset of PowerDB Pro forms applicable to your instrument	■	■		
Files can import into PowerDB Pro	■	■	■	
Relay/Breaker/Recloser curve library	■	■	■	■
Completed forms are saved as files to your computer	■	■	■	■
Associates current test data with historical results	■	■	■	■
Control Megger instruments and download test data		■	■	■
Control non-Megger instruments			■	■
280+ industry standard test forms are provided			■	■
Advanced Relay Form			■	■
Trend historical results for asset for predictive failure analysis			■	■
Trend historical results for asset against other similar assets				■
Database functionality to manage data for all electrical equipment				■
One step report generation				■
Summarize noted comments and/or deficiencies				■
Trigger work order and maintenance schedules				■
Synchronize results from field to master database				■
Synchronize results with other testers				■
Form editor allows test sheets to be created or customized				■
Import data from other software packages				■
Maintain calibration data for test instruments				■

MEGGER LOW RESISTANCE TEST EQUIPMENT



52

DLRO®10 and DLRO®10X Digital Low Resistance Ohmmeters

- Accurate results in less than 3 seconds
- Output limited to 0.25W to avoid test piece heating
- Auto current reversal cancels standing EMFs
- Fuse protected to 600 V



53

247000 Series DLROs 10/100A Microhmmeter

- Dual-Pak Battery Operated (10 A)
- Single-Pak Battery Operated (10 A)
- Single-Pak/Low Range Battery Operated (10 A)
- Low-Range/High-Current Line and Battery Operated (100 A)



54

DLRO®10HD Dual Power 10 A Low Resistance Ohmmeter

- High or low output power selection for condition diagnosis
- Rechargeable battery or line power supply, continuous operation, even with dead battery
- 10 A for 60 seconds, less time waiting to cool, great for charging inductance
- High input protection to 600 V, inadvertent connection to line or UPS voltage will not blow a fuse



55

MJÖLNER 200 Microhmmeter

- Designed for measuring contact resistances of circuit breakers, contacts, disconnect switches, bus-bar joints, and other high current links
- Ability to store test results
- Output current to 200 Amps
- Built in thermal printer

MJÖLNER 600 Microhmmeter

- Same easy-to-use front panel operation
- The MJÖLNER 600 can output 300 A continuously when required
- Weight is 25lbs lighter than legacy microhmmeters



56

MOM200/600A Microhmmeters

- Measures contact resistance in circuit breakers, disconnecting switches, busbar connections, safety devices, etc.
- Easy to operate
- Designed for rugged field use
- Highly flexible cable connections



57

DLRO®200-115 Digital Microhmmeter

- Small and weighs less than 33 lbs
- Onboard memory for up to 300 test results
- Test currents from 10 A to 200 A dc
- Filtered output



58

DLRO®600 Digital Microhmmeter

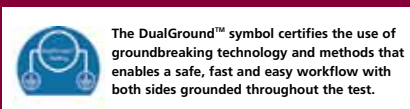
- Small and lightweight at less than 33 lbs
- $\mu\Omega$ best resolution
- On-board memory for 300 test results and notes
- RS232 port to download stored results



59

DLRO-H200 Micro-ohmmeter

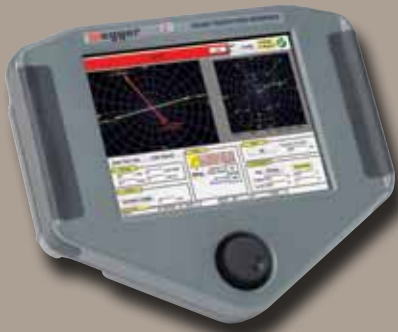
- Bluetooth headset for audible pass/fail testing against adjustable limits
- Up to 240 Amps
- Battery supplied
- Lightweight – 2.2 lbs



The DualGround™ symbol certifies the use of groundbreaking technology and methods that enables a safe, fast and easy workflow with both sides grounded throughout the test.



MEGGER PROTECTIVE RELAY TEST EQUIPMENT



60

STVI - Smart Touch View Interface Handheld Controller for SMRT and MPRT Test Sets

- Large High Resolution Color TFT LCD touch-screen intuitive smart navigation makes testing relays easier
- Designed for either right or left handed operation with control knob centrally located
- Automatic Ramp, Pulse Ramp, and Pulse Ramp Binary Search Capability for pick up and dropout tests
- Overcurrent Relay Test includes IEC, IEEE and hundreds of built-in Specific Relay Time-Curves



61

SMRT1 - Single Phase Relay Test System

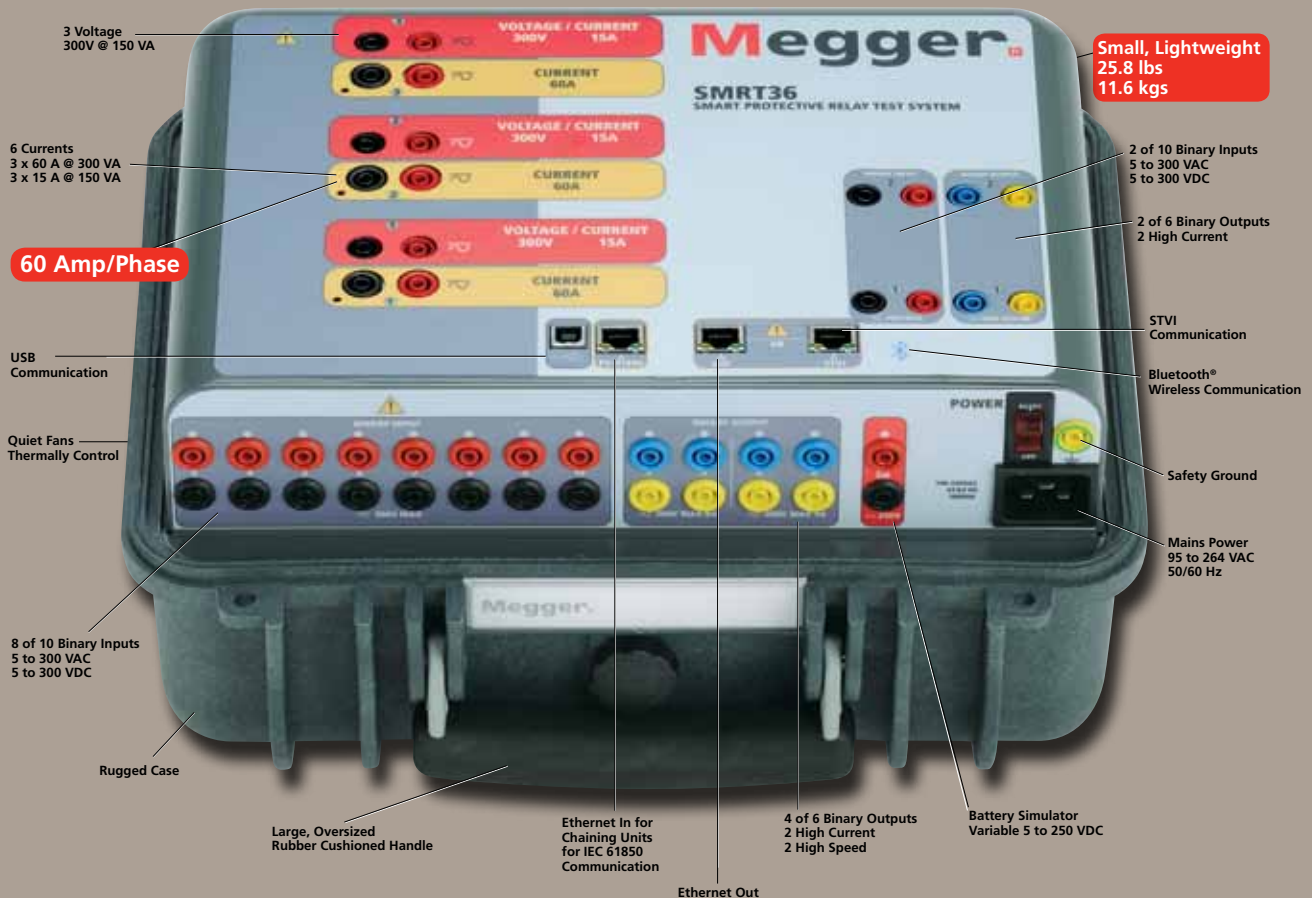
- Single Phase High current, high power up to 75 Amps/400 VA rms)
- Small, rugged, lightweight and powerful
- Operate with or without a computer
- Intuitive manual operation with Smart Touch View Interface



62

SMRT36 - Three Phase Relay Test System

- High current, high power (60 Amps/300 VA rms) per phase
- Small, rugged, lightweight and powerful
- Operate with or without a computer
- Intuitive manual operation with Smart Touch View Interface



MEGGER PROTECTIVE RELAY TEST EQUIPMENT

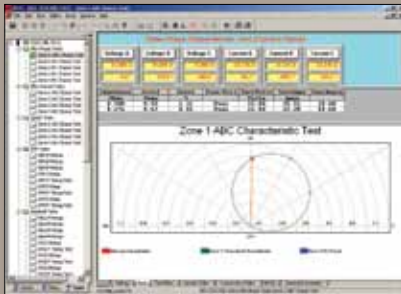


63

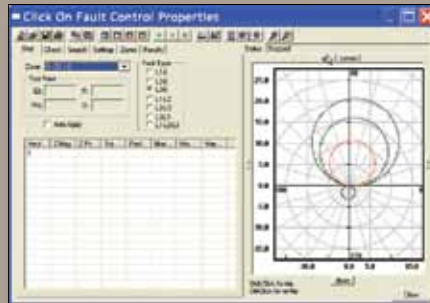
MPRT8445 Protective Relay Test System

- Open communication architecture for third party software applications
- Increased output current and power of 45 amps at 300 VA per phase
- Improved low current accuracy
- Convertible voltage channel rated at 15 amps

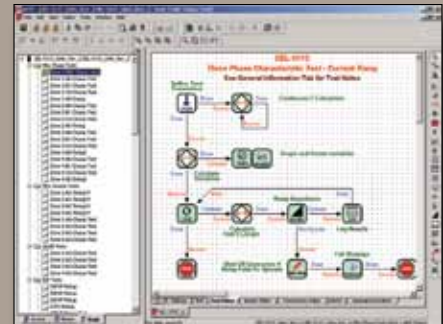
RELAY TEST SOFTWARE



Main AVTS Screen



NEW Online Vector Control Screen

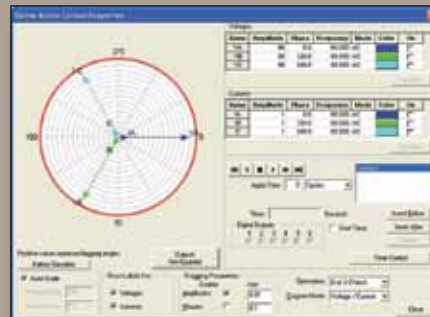


Test Editor Screen

64

AVTS (Advanced Visual Test Software)

- Three levels of operation – Basic, Advanced, Professional
- Ability to communicate with relay while testing via Modbus or VB Script – pulls in relay setting prior to test, and tests relays to settings
- Fully automated testing for popular complex relays – dramatically reduces the test time and learning curve prior to testing
- Recorder Capability – review output waveforms and binary input/outputs without expensive external equipment



Click-On-Fault Test Screen with Multi-Zone Mho Distance Relay

65

AVTS Relay Test Modules

- Complete, ready-to-use relay test modules for both electromechanical and microprocessor based relays
- Over 100 different test modules to choose from covering the most popular relays made by GE, Schweitzer, ABB/Westinghouse, Siemens, Beckwith and Basler
- Modules are designed to completely test the relay to individual manufacturer specifications

MEGGER PROTECTIVE RELAY TEST EQUIPMENT



66

FREJA 300/306

- Operate with or without a PC
- Calibration box for easy calibration
- Generated values shown on local display
- FREJA 300 - 3 current channels



67

SVERKER 780 Relay Test Sets

- The engineer's toolbox for all single phase relay testing
- Stand-alone functionality
- Rugged and reliable for field use



68

SVERKER 650

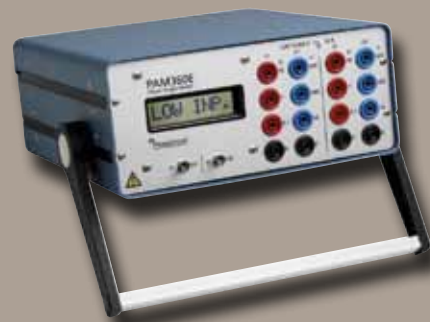
- High current/high power output
- Lightweight, portable and designed for rugged field use
- 0 to 100 Amp output current
- Suitable for testing many different types of relays such as power, voltage and current



69

PMM-1 Power Multimeter

- Simultaneous measurement and display of all 3-phase system parameters
- Accurate phase angle measurement at low current levels
- Versatile, menu-driven instrument



70

PAM360E PHASE ANGLE METER

- Designed for use in substation or industrial environments
- Compact, lightweight and easy to use
- Switchable input between current and voltage
- Economically priced

MEGGER CABLE TEST/FAULT LOCATING EQUIPMENT



71

PFL22M1500 Portable Cable Fault Location System

- Portable, rugged fault locating systems
- HV insulation testing to 20 kV
- Proof/burn up to 20 kV, 115 mA
- 8/16 kV, 1500 Joules surge output



72

PFL40A Series Constant Energy Power Cable Fault Locating System

- Compact, portable fault locating system
- Proof (DC) testing to 40 kV
- High-voltage surge to 34 kV
- 8/16/34 kV, 2000 Joules surge output (4 kV 1500 Joule range optional)



73

NEW MPP2000 Pinpointer

- Quickly determine cable fault distance and direction via single or dual detection configuration
- Rugged, compact weather resistant housing
- Easy, trouble-free probe connection with a detachable cable system



74

Electromagnetic Impulse Detector

- Indicates direction of fault
- Works under all weather conditions
- Converts to voltage gradient tester with optional earth frame



75

L1050 Portable Fault Locator

- Multiple output frequencies
- High power at low frequency
- Superior receiver filtering



76

L1070 Portable Fault Locator

- Passive 60 Hz detection serves as an excellent safety feature
- Multiple transmit/receive frequencies provide accurate long or short range locates
- SONDE support

MEGGER CABLE TEST/FAULT LOCATING EQUIPMENT



77

Suitcase Impulse Detector

- Simple, maintenance-free operation
- Compact design
- Noiseless discharge technique



78

Arc Reflection Filters

- Choice of standard or heavy-duty models
- Delivers highest energy levels to the fault
- Designed for safe, continuous operation

15-kV Portable, Dual-Voltage and Heavy-Duty Impulse Detectors

- Three models to choose from
- Engineered to assure optimum operator safety
- Locates faults by the high-voltage impulse method



79

15-kV Portable Model: for lightweight economy, this 75 lb (34 kg) instrument discharges 563 Joules at 15 kV.



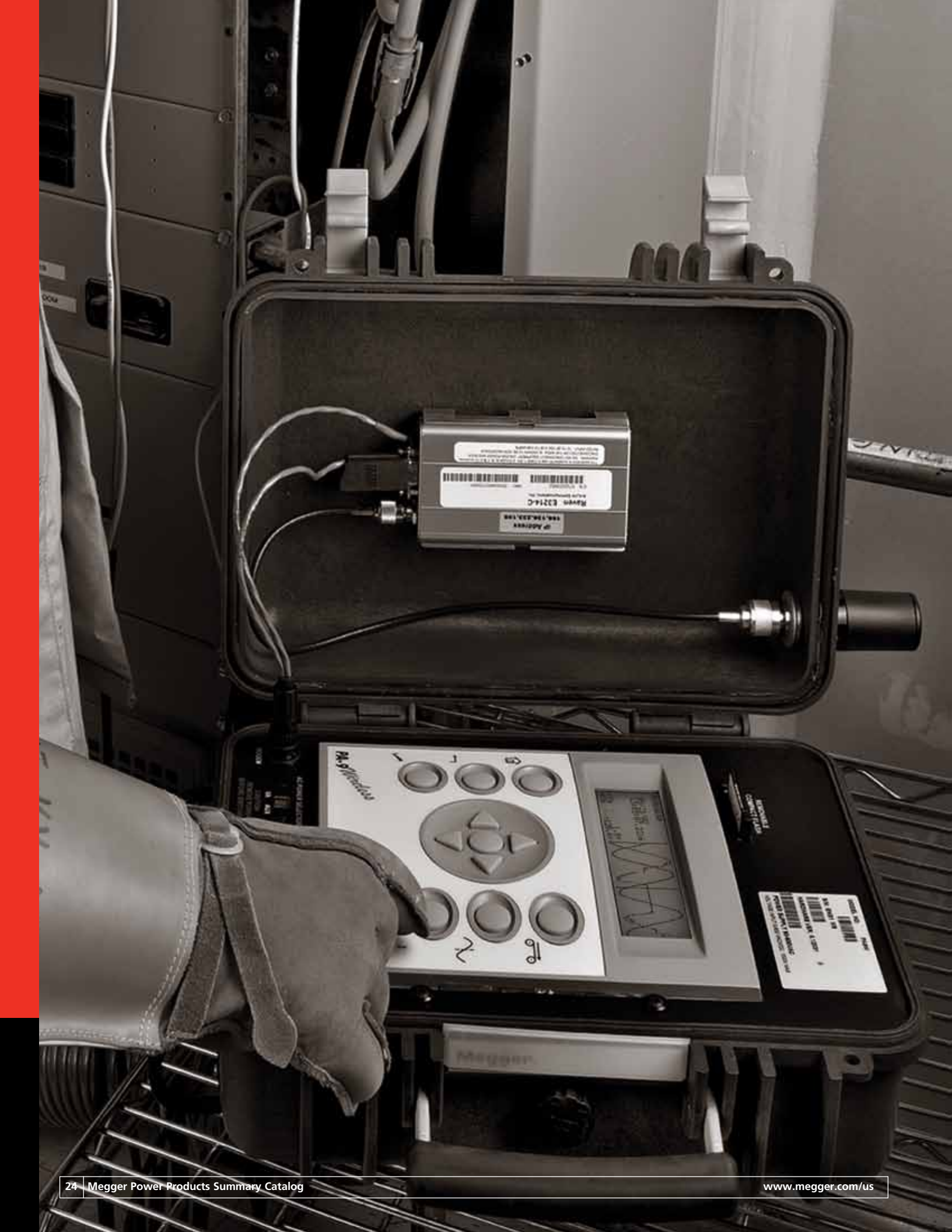
80

Dual-Voltage Model: this constant energy unit features dual voltages to permit up to 450 Joules to be discharged over both a 7.5 and 15 kV range. On the 7.5 kV range this unit utilizes a 16 μ F capacitor which produces a loud "thump" at the fault.



81

Heavy-Duty Model: with its 3,750 or 7,500 Joule at 25 kV impulse voltage output, this unit can find faults on 35 kV class direct buried cable or in conduit or duct. The 65 kV proof mode permits acceptance testing of 15 kV class cable and maintenance testing of 25 kV class cable.



IP Address
198.198.223.198
Model: 62214-C
Megger Power Products, Inc.
10000
Barcode
Model: 62214-C
Megger Power Products, Inc.
10000

Megger
62214-C
Digital
Control Panel
LCD Display
Waveform
AC
DC
Buttons
Megger

Model: 62214-C
Barcode
Megger Power Products, Inc.
10000

MEGGER WATTHOUR METER TEST EQUIPMENT



82

PHAZER Watthour Meter Test Set

- True three-phase and single-phase testing capabilities
- Fully automatic operation
- Quick Action Socket opens automatically
- Built-in Watt-hour, Var-hour, Q-hour and VA-hour testing capability is standard



83

PA-2505K Phantom Load

- Full-scale range simultaneously selected by current-range selector switch
- Eliminate need to change leads
- Selectable 50% or 100% power factor
- Test single or polyphase watthour meters



84

Meter Test Jacks

E-Z Test™ 99800 Series

- Standard of the industry
- Designed to increase safety
- Simplified testing of socket-type watthour meters
- Safe, convenient and efficient way to test virtually all socket-type meters

MEGGER POWER QUALITY ANALYZERS



85

PA-9 Plus, 9-Channel Recorder

- Complies with all applicable IEC, IEEE, EN Standards and CE marking
- On-site analysis and data retrieval without a computer
- Intelligent download – select only the data required
- 9 channel: 4 voltage and 5 current channels



86

PA9 Wireless

- Wireless modem/internet accessible
- A ruggedized, full-featured instrument measuring to worldwide PQ standards
- Wireless modem allows for remote analysis and retrieval of data, and remote unit configuration
- Trends voltage, current, imbalance, power, energy, events, flicker (PST/PLT), THD, TDD, individual harmonics, and frequency



87

SLM-8, 8-Channel Recording Volt-Ammeter

- Quick setup, immediate analysis
- Self-power operation
- 3-phase voltage, current, loose neutral detection, sag and swell detection as well as flicker recorder
- Optional PCMCIA card/memory

MEGGER POWER QUALITY TEST EQUIPMENT & SOFTWARE



88

MR-4 Meter Adapter Recorders

- Detects sags, swells, sub-cycle events, THD events, loose neutrals and flicker
- Ideal for split-phase residential and light commercial investigations
- Records Voltage, Current, Power, Energy, Harmonics and Voltage Regulation Data
- Installs quickly and safely, no exposed wiring

89

WinReport - MR-4 Data Analysis Software

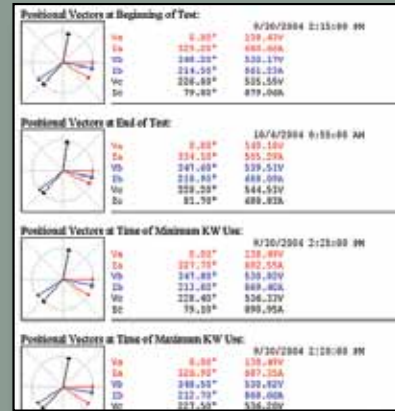
- Automatic Data Analysis of recorded MR-4 data files
- Generates custom report in Word complete with logos and text
- Download the data from the unit and with 3 clicks of the mouse WinReport lets you see where the trouble is



90

MDP Series - Distribution Profiler

- Choice of three models that record currents up to 1000 amps, with an additional 200 amp over-range
- Waveform capture and harmonic analysis up to the 32nd order
- Power factor/power, KW, KVAR and KVA
- Accurate data capture via advanced MDP software

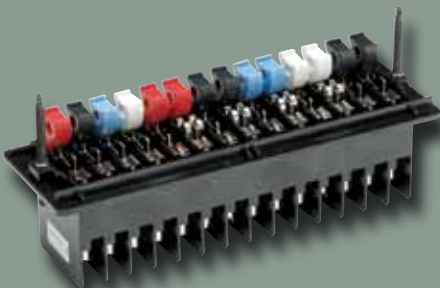


91

MetReport - Data Analysis software

- Automatically analyze your data files.
- A powerful report generation tool for Megger Power Quality Analyzers PA-9 Plus and PA-9 Wireless
- An integrated wizard function included for simplicity
- Output completed reports into a standard Microsoft Word Document

STATES® TERMINAL BLOCKS AND TEST SWITCHES



92

STATES FMS Semiflush-Mounted Test Switches

- Select from 1-10, 1-14, 1-30 or choose any combination of switches (also available in a 19" rack configuration)
- Safe, durable, rugged and reliable
- Choice of black or clear covers with provision to apply seal
- UL Listed and CSA certified



93

STATES Single Current Test Probe (Model 15000)

Used in configuration with the current shunt jack on STATES Test Switches, this probe provides a safe, quick connection for indicating or testing instruments without opening CT secondaries or disturbing permanent wiring. The probe is easily inserted at right angles to the test switches.



94

STATES Test Paddles

- 10 and 14 pole configurations
- Ergonomically designed handle, use only one hand to connect to test switch
- Labeled 4-way connectors to locate connector to corresponding switch
- Used for STATES FMS Test Switches and ABB FT-1 10 pole Test Switch



BITE3 Battery Impedance Test Set

- Cell by cell evaluation
- Determines the health of lead-acid batteries up to 2000 Ah
- On-line testing with Pass/Warning/Fail calculations
- Measures impedance, intercell connection resistance, cell voltage
- Windows® CE Operating System with more than 16 MB of memory
- Measures float and ripple currents

The BITE3 is a battery-operated, instrument with powerful on-board data analysis tools. It is the first-of-its-kind instrument that allows the user to perform onsite analysis. The instrument's menus are easy to navigate with a bright backlit LCD. The data display includes the normal numeric arrangement but adds two graphical displays to help analyze weak cells.

You can facilitate test data acquisition by using **PowerDB Software** (see page 16).



BITE2 and BITE2P Battery Impedance Test Sets

- Cell by cell condition evaluation
- Determines the condition of lead-acid and NiCad batteries up to 7000Ah
- On-board Pass/W arning/Fail indications
- On-line testing
- The BITE2P includes a built-in printer

The BITE2 and BITE2P Battery Impedance Test Equipment work by applying an AC test current across the battery string while on-line, then measuring the impedance, cell voltage and intercell connection resistance. They also measure ripple current which indicates the condition of the charger. The BITE2 and BITE2P instruments are perfect for evaluating the condition of the entire string from terminal plate to terminal plate and even the charger.

You can facilitate test data acquisition by using **PowerDB Software** (see page 16).



Digital Hydrometer

- Measures specific gravity and temperature
- Follows IEEE 450 recommended practices for specific gravity checks
- Memory for eight tests of up to 256 cells each
- One hand operation
- Splash-proof membrane keypad
- Automatically compensates to 77° F (25° C) the specific gravity reading for the sample's temperature
- Downloading to **ProActiv** and **PowerDB**

The digital hydrometer accurately and quickly determines specific gravity of flooded battery cells. Simply draw the electrolyte into the tester and the specific gravity and temperature are determined in five seconds. On board memory storage allows downloading to software.

You can facilitate test data acquisition by using **PowerDB Software** (see page 16).



Battery Ground Fault Tracer

- Easily locates ground faults on in-service DC battery systems
- Operates in high electrical noise environments
- Simplifies fault tracing by identifying fault characteristic magnitudes (resistive and capacitive)

The Battery Ground-Fault Tracer is an economical, manually balanced instrument that identifies, tracks and locates ground faults in ungrounded DC battery systems - on-line. It is particularly effective in high electrical noise environments, as the strength of the test current can be adjusted.

The Battery Ground-Fault Tracer accelerates fault location by eliminating trial and error procedures and because faults can be located without going off-line. It is particularly useful in any industry where supply of power for operating measurement, communication and control equipment is critical.



Battery Ground Fault Locator

- Easily locates ground faults in ungrounded DC battery systems
- Battery-operated
- Automatic bridge simplifies fault tracing by identifying fault characteristic magnitudes (resistive and capacitive)

This instrument is specifically designed to detect, track and locate ground faults on battery systems without resorting to sectionalizing! The BGL tracks and locates ground faults on live or dead battery systems. To save hours of unnecessary troubleshooting, the BGL readily differentiates between the resistive fault currents and capacitive charging currents. This feature allows the instrument to detect and track leakage paths, even in the presence of surge-suppression capacitors.



BVM Battery Voltage Monitoring

- Automates battery voltage measurement during capacity tests
- "Daisy-chain" design allows expandability up to 120 units
- High accuracy and stability for precise data collection
- Integrates **PowerDB Test Data Management software** (see page 16)
- Wide voltage range

The Megger BVM is a battery voltage measurement device that is used for the capacity testing of large, industrial battery banks commonly found in electrical power sub-stations, telecom facilities and computer data center UPS systems. When used in conjunction with a load device, such as the TORDEL unit, and test data management software, such as **PowerDB**, the BVM enables to perform a completely automated battery bank capacity test, according to IEC test method. The test also meet NERC/FERC requirements. The BVM is designed in modular form where one BVM device is used for each battery or "jar" in the string to be tested. One BVM for each battery connects to the next in a "daisy-chain" fashion, thereby providing easy and economical expandability to meet the testing requirements for small-to-large battery bank systems.

The included dolphin clip can be easily removed and exchanged with different styles of standard banana plug clamps and/or extension cables to accommodate any battery connection requirement.



TORDEL 840/860 Battery Load Units

- Battery banks can be tested "in service" or off-line
- Unit uses battery load and provides regulated load to meet test parameters
- User adjustable alarm and shutdown points to avoid excessive discharge
- Easily expandable for larger battery banks using TXL extra load units
- Now works with PowerDB to automatically generate test reports that can be saved in an XML file with all historical data

TORDEL® 840 - UTILITY – Used for battery systems ranging from 12 to 250 V – often encountered in switchgear and similar equipment. Tests can be conducted at constant current, constant power, constant resistance or in accordance with a pre-selected load profile.

TORDEL 860-Multi – Designed for testing battery systems rated over the range from 12 to 480 volts. It features excellent discharging capacity plus a broad voltage range and outstanding portability.

TORDEL WIN Software – View test parameters/results "real time" as testing progresses



TXL870 Extra Load Accessory for TORDEL units

- Intended for 125-250 V systems
- Designed for use together with Torkel Battery Load Units
- Provides higher load current for use in constant current or constant power test
- Automatic shut down

The **TXL870 Extra Load** is designed for use with the TORDEL units and intended for 125-250 V systems. Together, the TXL870 and TORDEL form a system that can discharge batteries with currents of up to several kA. The TXL870 is connected directly to the battery, and the TORDEL measures the total current using a clamp-on ammeter.

The TXL870 does not perform any regulating functions. Its purpose is to provide higher load currents for use in constant current or constant power tests.



S1-552/2

- 5 mA high charging current for testing large generators and cables
- 15 T measurement range
- CAT IV 600 V rating
- Extended operating temperature (-20° C to +50° C)
- Data storage and downloading (RS232 or USB) capability
- Automatic IR, PI, DD, SV and DAR tests
- **PowerDB Lite software** included (see page 16)

The new S1-552/2 insulation tester features five preprogrammed test voltages (250, 500, 1000, 2500 and 5000 V) and measures to 15 T on the digital scale. Change the sentence in the description to. It also has the ability to change the voltage setting in 10 V increments from 50 to 1000 V and in 25 V increments beyond 1000 V. The S1-552/2 is able to take effective readings in high voltage substations and switchyards with a noise rejection of 2 mA at 200 kV and above substations or switchyards.



S1-554/2

- An industry best 4 mA noise rejection
- 5 mA high charging current for testing large generators and cables
- 15 T measurement range
- CAT IV 600 V rating
- Extended operating temperature (-20° C to +50° C)
- Data storage and downloading (RS232 or USB) capability
- Automatic IR, PI, DD, SV and DAR tests
- **PowerDB Lite software** included (see page 16)

The new S1-554/2 includes all the capabilities and features of the S1-552/2 plus extended noise and interference rejection up to 4mA. This virtually eliminates the possibility of poor, unreliable or unstable readings being made in noisy 400 kV and above substations or switchyards.



S1-1052/2

- 5 mA high charging current for testing large generators and cables
- 35 TΩ measurement range
- CAT IV 600 V rating
- Extended operating temperature (-20° C to +50° C)
- Data storage and downloading (RS232 or USB) capability
- Automatic DAR, PI, SV and DD tests
- **PowerDB Lite software** included (see page 16)

The new S1-1052/2 has all the capabilities of the S1-552/2 and S1-554/2, plus a 10,000 V range and the ability to measure 35 T on the digital scale. The unit also conforms to the IEEE Standard 43-2000 "Recommended Practice for Testing Insulation Resistance of Rotating Machinery." The S1-1052/2 is able to take effective readings in high voltage substations and switchyards with a noise rejection of 2 mA at 200 kV and above substations or switchyards.

12

S1-1054/2

- An industry best 4 mA noise rejection
- 5 mA high charging current for testing large generators and cables
- 35 TΩ measurement range
- CAT IV 600 V rating
- Extended operating temperature (-20° C to +50° C)
- Data storage and downloading (RS232 or USB) capability
- Automatic DAR, PI, SV and DD tests
- **PowerDB Lite software** included (see page 16)

The new S1-1054/2 includes all the capabilities and features of the S1-1052/2, plus noise and interference rejection extended to 4mA. This virtually eliminates the possibility of poor, unreliable or unstable readings being made in noisy 400 kV and above substations or switchyards.

13

70-kV, 120-kV and 160-kV DC Dielectric Test Sets

- Light weight air-insulated design
- Separate high-voltage module for maximum operator safety
- Filtered half-wave rectification matches performance of high priced full-wave rectification sets

The Megger high-voltage 70-, 120-, and 160-kV DC test sets provide dependable, portable testing of a wide variety of insulating systems. Common applications include the insulation testing of motors, switchgear, insulators, aerial booms and buckets, and transformers. High-voltage DC testing can also be performed as an acceptance test on PLC and EPR electric power cables. An optional high-voltage discharge grounding stick is available to aid in hastening the discharge of highly capacitive samples.

14

OTS60PB, OTS80PB and AF Oil Test Sets

- Lightest - minimum weight 30 lbs - portable instruments for measuring insulating oil breakdown voltage
- Lock in precision - oil vessel with lockable adjustment
- Bright 3.5 inch color display visible outdoors
- Suitable for mineral, ester and silicon oils
- Trip detection circuit with direct measurement of voltage and current
- Ultra fast (<10 μs) HV switch off time

Megger's automatic portable oil test sets perform accurate breakdown voltage tests on mineral, ester and silicon insulating liquids. Moulded test vessels give repeatable results in the field and laboratory with lock in precision electrode gap setting adjustment wheels. The transparent, shielded lid is a key feature enabling users to see what is happening within the test chamber.

Megger portable 60 kV and 80 kV oil test sets are the lightest on the market ranging from 16 kg to 23.5 kg depending on model and configuration. They come complete with optional carry bag and transport case. The carry bag has pouches for electrode accessory pack, leads, quick user guide, paper roll etc.

The OTS range includes five models. The OTS60AF, OTS80AF and OTS100AF are primarily intended for use in fixed locations, such as laboratories, and offer maximum test voltages of 60 kV, 80 kV and 100 kV respectively. The OTS60PB and OTS80PB are compact lightweight instruments for portable use and offer maximum test voltages of 60 kV and 80 kV respectively.

15

NEW DELTA4000 10-kV Automated Insulation Test Set

- Industry's Lightest multi-piece design at 36kg (14+22)
- Industry Leading Functionality with built-in Individual Temperature Correction (patent pending); Automatic Non-Linear Detection (patent pending); Automated measurement with PowerDB SW and Manual Control for customized testing.
- Industry Leading Frequency Range (5-500Hz)
- Built-in Analysis & Trending tools with PowerDB Software
- Rugged & Portable for Field & Shop use, designed to work in high interference substations
- Industry's Fastest Test Times

The new DELTA4000 Series is a fully automatic 12 kV insulation power factor/dissipation factor (tanδ) test set designed for condition assessment of electrical insulation in high voltage apparatus such as transformers, bushings, circuit breakers,

cables, lightning arresters and rotating machinery. The DELTA4000 Series can be used to measure the excitation current of transformer windings as well as to perform automatic tip-up tests and HV turns-ratio testing (an optional TTR Capacitor kit is available). The test set is designed to provide a comprehensive AC insulation diagnostic test. The high power variable frequency design generates its own test signal independent of line frequency quality and the hardware design uses the latest technology available for digital filtering of the response signal.

ACCESSORIES FOR AUTOMATIC AND SEMI-AUTOMATIC POWER FACTOR (C&DF) TEST SETS

16

Capacitor Kit

Includes carry case, TTR capacitor (left), and 2 reference capacitors (center). Also shown are 2 connectors (right) that will work with the capacitors and are supplied with the Power Factor (C&DF) Test Sets.

17

Accessory Kit

Includes mini bushing tap connectors, hot collar straps, temperature/humidity meter, .75" bushing tap connector, 1" bushing tap connector, "J" probe bushing tap connector, 3-ft non-insulating shorting leads, 6-ft non-insulating shorting leads.

18

Oil Test Cell

Used for testing insulating fluids up to 10 kV.

19

Resonating Inductor

Expands the range of Power Factor (C&DF) Test Sets.

20

Calibration Standard

Traceable to the NIST for quick operating or calibration checks of test sets calibrated in watts loss or in dissipation factor.

21

TTR25, Basic Hand-held TTR

- Extremely light at a mere 1.9 lbs
- Simple, push-to-test operation
- Measures turns ratio from 0.8 to 20,000:1 and excitation current up to 100 mA
- Made of durable ABS plastic

The TTR25 is a basic, hand-held Transformer Turns Ratio Test Set based on the full-featured TTR100. It is a simple, push-to-test instrument with few buttons and no menus. It does allow the user to select the language (English, German, Spanish, Portuguese, French) and allows printing and uploading of data in real-time. The measurement principle is the same as our other TTRs. It uses a 55 Hz signal and measures turns ratio, polarity and excitation current.

22

TTR100, Advanced Hand-held TTR

- Most accurate with highest turns ratio in a hand-held TTR in the industry
- Lightweight (3.3 lb) and robust; ideal for field and substation environments
- Measures turns ratio of power, distribution transformers, and regulators, single and three phase (one phase at a time), as well as PTs and CTs

The TTR100 is an advanced handheld, robust, lightweight and battery operated instrument offering functions such as winding resistance, polarity and phase angle measurement. With a turn ratio of 20,000:1, the TTR100 offers excellent turns ratio accuracy of ±0.1% and is equipped with sufficient on-board memory to store up to 200 test results, as well as 100 user-defined transformer test configurations.

You can facilitate test data acquisition by using **PowerDB Software** (see page 16).

23

Single-Phase, Hand-crank TTR

Megger still offers its rugged and reliable Hand-cranked TTR for measuring turns ratio up to approximately 330:1.

24

TTR330 3-Phase Transformer Turns Ratio Test Set with "PowerDB ONBOARD"

- NEW - Transformer vector recognition
- Fully automatic operation (stand-alone or remote-control)
- Integrated PowerDB ONBOARD allows for data analysis and trending while still in the field
- Built-in USB port and optional USB printer allows for 8.5" x 11" test forms printing without the use of a laptop
- Built-in capability for storing test results, in an open XML format, to either internal memory or to an external USB storage device
- Full 8.4" VGA color display
- **PowerDB software** (see page 16)

The TTR330 is designed to measure the turns ratio of power, instrument, and distribution transformers in a substation or manufacturing environment. It features a high contrast 8.4" full VGA color display which can be seen even in direct sunlight environments.

The instrument has a full QWERTY keyboard for entering nameplate, location information, test configuration, and annotation. Communications ports are provided in the form of both USB and Ethernet ports for easy storage and downloading of results. With PowerDB ONBOARD, the unit can perform data analysis, trending, and test form printing, all while out in the field, and without the use of a PC laptop.

25

TTR310 3-Phase Transformer Turns Ratio Test Set

- NEW - Transformer vector recognition
- Text-based LCD interface unit
- Replaces the 550503 TTR
- Fully automatic operation (either stand-alone or remote-control)
- Field upgradeable to a TTR330 or TTR320 without compromise to calibration
- Built-in RS232 serial port and optional thermal printer allows for printing of test results while in the field, without an external printer
- Integral capability for storing test results into internal memory in an open data format for direct input into Excel® or XML format via PowerDB LITE
- USB storage
- **PowerDB Lite software** included (see page 16)

The TTR310 features an easy-to-read, high contrast LCD user interface for instrument set-up and test set operation. The TTR310 also comes equipped with specially designed leads which provide the necessary flexibility needed in cold weather. The TTR310 comes complete with PowerDB LITE, a new powerful PC Windows® based software program. PowerDB LITE allows the operator to completely program a test routine for a transformer, save it under the transformer ID number and then recall it a future time.

26**TTR300 3-Phase Transformer Turns Ratio Test Set**

- NEW - Transformer vector recognition
- Remote controlled "black box" unit
- Field upgradeable to a model TTR310, TTR320 or TTR330 without compromise to calibration
- Built-in capability for storing test results into internal memory in an open XML data format via PowerDB LITE
- Quickly download test results via RS-232 serial port
- **PowerDB Lite software** included (see page 16)

The TTR300 is designed to be completely remote controlled via a PC, running PowerDB LITE (included) or the optional **PowerDB** (full version) PC software applications. The unit is "field upgradeable" to a TTR310, TTR320 or TTR330 which will not affect calibration.

27**MLR10 10 Amp Leakage Reactance Tester**

- Measures the short circuit impedance of transformers
- Useful in detecting and diagnosing winding deformation
- Capable of performing measurements in single- or three-phase transformers
- Optional capacitor bank testing

The Megger Leakage Reactor Tester MLR10 is used to measure leakage reactance and other associated parameters in high voltage power transformers. Leakage reactance, or more generally leakage impedance, is measured at the transformer primary winding while the secondary winding is shorted.

28**FRAX 101 Sweep Frequency Response Analyzer**

- Smallest and most rugged FRA instrument in the industry
- Highest possible repeatability by using reliable cable practice and high-performance instrumentation
- Fulfills all international standards for SFRA measurements
- Highest dynamic range and accuracy in the industry
- Wireless communication and battery operated
- Advanced analysis and decision support built into the software
- Imports data from other FRA test sets

The FRAX Sweep Frequency Response Analyzers (SFRA) detects potential mechanical and electrical problems that other methods are unable to detect. Major utilities and service companies have used the FRA method for more than a decade. The measurement is easy to perform and will capture a unique "fingerprint" of the transformer. The measurement is compared to a reference "fingerprint" and gives a direct answer if the mechanical parts of the transformer are unchanged or not. Deviations indicate geometrical and/or electrical changes within the transformer.

29**FRAX 150 Sweep Frequency Response Analyzer**

- Highest dynamic range and accuracy in the industry
- Built-in PC with powerful backlit screen for use in direct sunlight
- Highest possible repeatability by using reliable cable practice and high-performance instrumentation
- Fulfills all international standards for SFRA measurements
- Advanced analysis and decision support built into the software
- Imports data from other FRA test sets

30**MTO210 Transformer Ohmmeter**

- Direct 2-channel digital reading (1 m to 2000)
- DC test current up to 10 A maximum
- Patented "Quick Test" measurement technique
- 0.25% measurement accuracy
- Integrated demagnetization feature
- Tests operation of on-load tap-changers
- Very fast auto safety discharge circuit

31**MTO330 Automated Six-Winding Transformer Ohmmeter**

- One-time connection principle results in a 4x faster setup time eliminating over 70% of safety risk*
- Automated eight-terminal/six-winding measurement capability
- Interchangeable lead set with the Megger 3-phase series of TTRs
- Simultaneous winding magnetization for fast and accurate dc winding resistance measurements of high inductive loads
- Built-in auto-demagnetization
- On-load tap changer operation testing

The MTO3XX series delivers full eight-terminal/six-winding resistance measurement capability. It is designed to save time by testing all six windings without having to disconnect and reconnect leads. Also, the simultaneous winding magnetization (SWM) method gives fast and reliable measurements even on large transformers with delta configuration on the low voltage side. Additionally, the MTO3XX series leads are interchangeable with the Megger TTR300 series of three-phase turns ratio instruments which eliminates additional connecting time for turns ratio measurements.

The MTO3XX series consists of two models:

The base model, MTO300, is designed to be remote controlled via PowerDB software on an external PC or a Megger transformer test product with on-board computer.

The MTO330 is also equipped with an onboard computer featuring full QWERTY keyboard and navigational pushbuttons as displayed on an 8.4 inch full-color VGA transfective screen viewable in bright sunlight.

32**MCT1605 Multi-Tap Automatic Current Transformer Saturation, Ratio and Polarity Test Set**

- One button automated test: Demagnetization, on multi-ratio CTs test all Knee Point, Saturation, Polarity and Deviation, Winding Resistance, Insulation Resistance, and Burden
- Displays multiple instantaneous Saturation Curves with Knee Point
- Integrated 1 kV DC insulation test system
- Color daylight viewable graphical display
- "Save & Print Later" with USB stick
- Fast data entry using full QWERTY keyboard
- 1600 VAC Saturation Test Voltage
- Automatic or manual testing selectable

The Megger MCT1605 test set is a lightweight, robust, portable unit used to automatically or manually perform saturation, ratio, polarity, demagnetizing tests and insulation tests on current transformers. The MCT provides a microprocessor controlled variable voltage output and precision instrumentation for automatically testing single and multi-ratio CTs.

33**IDAX 300 Insulation Diagnostic Analyzer**

- Fast and accurate moisture assessment in power transformers
- Reliable results at any temperature
- Automated analysis of moisture content and oil conductivity — decisions at your finger tip
- True frequency domain measurement for highest noise immunity
- Performs non-intrusive insulation testing of transformers, bushings, cables and generators

34**VAX020 High Voltage Amplifier**

- Separate high voltage amplifier enables capacitance and dissipation factor measurements at 2 kV test voltage
- True and proven DFR/FDS technology for highest performance
- Large frequency range, DC to 1 kHz
- Compact design, weight < 5 kg

VAX 020 expands the IDAX test voltage range from 200 V to 2 kV improving the capability to perform accurate measurements in extreme high-interference environments, e.g. HVDC substations.

35**TM1800**

- Modular based design – user configurable TM1800 from nine different modules
- Built in PC with CABA Local software – advanced testing with predefined breaker test plans (templates), onsite measurement view and analysis
- Dual ground testing using DCM module – increased safety with both sides of breaker grounded
- Graphical results for quick interpretation – timing and motion measurements, coil currents
- USB and Ethernet communication interface – for quick back up, LAN connection and printer options
- CABA Win – for advanced data analysis, database interface and common test data archive (optional)

36**TM1600**

- The TM1600 is a modular instrument and can handle breakers with up to 12 main contacts and 12 resistive contacts
- Transducers are compatible with EGIL and TM1800 Instruments
- Uses same CABA Win software platform as used with EGIL and TM1800
- Base unit without motion capability is 14lbs. Motion module adds 2.4lbs.

The robust design contains powerful technology that streamlines circuit breaker testing. Sophisticated measurement modules enable great time savings as many parameters can be measured simultaneously, eliminating the need for new setup each time.

37**EGIL**

- Measures timing and travel of medium and high voltage breakers
- Tests three-phase breakers up to 240kV
- Dual-function timing channels for main and pre-insertion resistor contacts
- Extremely reliable and easy to use
- PC control with CABA Win software
- Provided with ready-to-use multi-cable sets

The EGIL is an automatic timer and motion analyzer for medium- and high-voltage substation circuit breakers. It is intended for use on circuit breakers with one contact per phase. EGIL incorporates features commonly found on more complex test systems, but is designed to be smaller, simpler to use and less expensive than other similar test sets. EGIL is designed to test circuit breakers having one main contact per phase.

38**SDRM201 Static/Dynamic Resistance Measurement Accessory for EGIL**

- Enables resistance measurement on circuit breakers
- Small and light weight
- A number of operations can be run with short waiting intervals

The SDRM201 is intended to use for both static and dynamic resistance measurements (SRM and DRM) on high voltage circuit breakers or other low resistive devices. Used together with EGIL the current and also the voltage-drop across the circuit breaker contacts are measured. The measuring unit can thus calculate the resistance as a function of time.

39**SDRM202 Static/Dynamic Resistance Measurement Accessory for TM1800, TM1600 and EGIL**

- Enables resistance measurement on circuit breakers
- Small and light weight
- A number of operations can be run with short waiting intervals

The SDRM202 is intended to use for both static and dynamic resistance measurements (SRM and DRM) on high voltage circuit breakers or other low resistive devices. Used together with TM1800, TM1600/MA61 or EGIL the current and also the voltage-drop across the circuit breaker contacts are measured. The measuring unit can thus calculate the resistance as a function of time.

40

OCR-8015

- 15 kVA, high-capacity output
- Tests virtually all reclosers
- Includes PowerDB Software

This easy-to-operate unit provides all the necessary features to properly coordinate reclosers with other electrical protective devices. It features a output rating of 15 kVA and an impedance matching network to reduce current decay. The OCR-8015 provides accurate results even when testing reclosers at current levels 10 times the coil rating and has a short-time overload capacity of 45 kVA.

OCR-9150

- 50 kVA, high-capacity output
- Tests virtually all reclosers
- Includes PowerDB Software

The OCR-9150 provides all the characteristics of the OCR-8015. In addition, it features an output rating of 50 kVA and has a short-time overload capacity of up to 150 kVA.

41

B10E

- Reliable and stable power supply for circuit breaker testing
- Continuously variable 24-250 V AC or DC output
- Separate outputs for close coil, trip coil and spring charging motor voltage
- Direct triggering for minimum trip voltage testing

The B10E is a portable self contained test set designed specifically for use in substations and industrial locations and is intended for testing medium and high voltage power circuit breakers. The B10E uses a ripple free variable DC voltage to operate breaker coils, and charging motors to ascertain the condition of these devices with respect to the manufacturer's original specifications.

42

Vidar

- Tests the integrity of vacuum interrupters quickly, safely and easily
- Six voltage settings (includes one user defined selection)
- Extensive voltage range
- Follows ANSI/IEEE standardized DC test methods
- Rugged, lightweight and portable

The VIDAR vacuum tester is used to test vacuum interrupters installed in circuit breakers and switches. VIDAR enables you to check the integrity of the vacuum interrupter quickly and conveniently by means of the known relationship of the flashover voltage and current in a vacuum interrupter. VIDAR permits you to select among test voltages from 10 to 60 kV DC.

VIDAR weighs only about 15 lbs (6 kg). Interrupters do not have to be dismounted for testing. It is ideal for use in the field or shop floor applications.

43

DDA-1600, DDA-3000 and DDA-6000

- Digital signal processing technology
- Variable firing angle and pulse duration
- Compliant with NEMA AB-4 test guidelines

DDA test sets incorporate the DDA-1 Digital Data Acquisition Instrumentation and Control System providing increased control of output current and high accuracy metering of the breaker under test. Universal in application, the DDA test sets will test virtually all low-voltage, molded-case and metal-clad, direct-acting ac circuit breakers rated up to 1600 through 6000-ampere frame size. The test sets also may be used for other high-current applications such as verifying the ratio of current transformers, testing thermal or magnetic motor overload relays, and performing heat runs or primary injection testing of high-voltage breakers and their associated protective relays.

44

PS-9116, PS-9130 and PS-9160

- Provides automatic control of the test set
- Extremely rugged and tests a wide range of circuit breakers
- Test results printout capability

Each test set incorporates a Model PLC-2000 Prime Logic Control System. It provides automatic control of the high current test set and storage and printing of test data. With built-in automatic test controls, the PS test sets will test almost all low-voltage, molded-case and metal-clad, direct-acting ac circuit breakers rated up to 1600 through 6000-ampere frame size.

45

ODEN AT Primary Current Injection Test Set

- Simplifies all types of switchgear and CT commissioning, ground grid, circuit breaker testing and more
- Modular design permits optimal user configuration of output current vs. unit size
- Compact transport cart facilitates portability into switchgear rooms with limited space
- Unique I/30 function allows the current to be pre-set using low current to prevent test sample heating

This powerful test system is designed for primary injection testing of protective relay equipment and circuit breakers. It is also used to test the turns ratio of current transformers and for other applications that require high variable currents. The system consists of a control unit together with one, two or three current units. All parts are portable, and ODEN AT can be quickly assembled and connected.

46

INGVAR Primary Current Injection Test System

- Most Advanced Primary Current Injection Test System to simplify all types of switchgear and CT commissioning, ground grid, circuit breaker testing and more
- Up to 5000 A output current
- Two units, each of about 20 kg (44 lbs), simplifies transportation
- Unique I/30 function allows the current to be pre-set using low current to prevent test sample heating, thus eliminating corruption of test result

This powerful test system is designed for primary injection testing of protective relay equipment and circuit breakers. It is also used to test the turns ratio of current transformers and for other applications that require high variable currents.

47

CB-360-DC Circuit Breaker Test Set,

- Capable of testing electromechanical or thermal-magnetic trip devices with dc current
- Digital timer
- Higher current output up to 30,000 Amperes

The CB-360-DC test set is a mobile, high current test set designed specifically for testing dc circuit breakers. It incorporates a variable high-current dc output, control circuitry, instrumentation, and overload and short-circuit protection.

48

CB-832

- Digital memory ammeter and multi-range timer
- 1800 A maximum current output (through a typical breaker)
- Solid-state output initiate circuit
- Lightweight and portable

The CB-832 test set is designed to test circuit breaker and overload relays by means of primary current injection. Model CB-832 is a self-contained test set that incorporates a variable high-current output and appropriate control circuitry and instrumentation for testing thermal, magnetic or solid-state motor overload relays, molded-case circuit breakers, and ground-fault trip devices.

49

CB-845

- Digital memory ammeter and multi-range timer
- 5000 A max current output (through a typical breaker)
- Solid-state output initiate circuitry
- Lightweight and portable

The CB-845 consists of a control unit and a high-current output unit, and can provide instantaneous current up to 5000 amperes through a 500-ampere circuit breaker. It is suitable for a wide variety of applications including molded-case circuit breakers, thermal, magnetic or solid-state motor overload relays, and other over-current protective devices.

50

MS-2A Circuit Breaker and Overcurrent Relay Test Set

- Light Weight, Portable Primary Injection Test Instrument
- Overcurrent Relay Testing
- Ground Fault Performance Testing for NEC 230.95
- Circuit Breaker Testing

Megger MS-2A is a self-contained test set that incorporates a variable high-current output and appropriate control circuitry and instrumentation for testing thermal, magnetic or solid-state motor overload relays, molded-case circuit breakers, ground-fault trip devices and overcurrent relays.

51

PowerDB Software - Data Collection & Data Management Software

- Synchronize all of your test records into a single corporate database
- Reduce test time
- Improve data integrity
- Standardize test procedures
- Track and manage your NERC PRC-005 data and test schedules
- Easily use historical trending for evaluation of test results
- Eliminates the need to install and maintain a software application per instrument
- Eliminates all hand written test sheets
- Create your own test forms
- Use or modify one of our hundreds of built-in test forms
- One step procedure to generate test reports with table of contents and deficiency summaries
- Custom integrations available with CMMS systems such as Maximo or SAP
- Imports from many other industry standard software applications
- Controls and imports data from many non-Megger instruments

PowerDB allows the user to facilitate test data acquisition and directly interfaces with these Megger products:

- AVTS Data Import
- BITE2
- BITE2P
- BITE3
- DELTA2000
- DELTA3000
- DELTA4000
- DET Earth/Ground Resistance Testers
- Digital Hydrometer
- DLRO10X
- DLRO200
- MCT1605
- MPRT
- OCR-Series
- Oil Test Sets
- S1 Series 5/10 kV Insulation Testers
- SMRT
- Torkel Battery Discharge Tester
- TTR300 Series

52

DLRO®10 and DLRO®10X Digital Low Resistance Ohmmeters

- Accurate results in less than 3 seconds
- Output limited to 0.25W to avoid test piece heating
- Auto current reversal cancels standing EMFs
- Fuse protected to 600 V
- NiMH battery reduces weight
- Detachable battery pack

The DLRO10 and 10X are fully automatic instruments, selecting the most suitable test current up to 10 A dc to measure resistance from 0.1 $\mu\Omega$ to 2000 Ω on one of seven ranges. Purchasing an additional battery pack will allow continuous testing. For those who desire more control over the measurement process, the DLRO10X model uses a menu system controlled by a two-axis paddle to allow manual selection of the test current and adds real-time download of results and on-board storage for later transfer to a PC. If you choose the DLRO10X, you can also automate test data acquisition

If you choose the DLRO10X, you can also automate test data acquisition and instrument control by using **PowerDB Software** (see page 16).

53

247000 Series DLROs

- Dual-Pak Battery Operated (10 A)
- Single-Pak Battery Operated (10 A)
- Single-Pak/Low Range Battery Operated (10 A)
- Low-Range/High-Current Line and Battery Operated (100 A)

This family of highly accurate instruments provide a simple, practical and reliable means of making low-resistance tests in the field, and also are ideal for production quality control.

They operate on the four-wire measurement principle, eliminating lead and contact resistances. With basic accuracies of $\pm 0.25\%$ and resolution down to 0.1 $\mu\Omega$, this DLRO series is designed to be rugged and portable for use at the job site. A variety of optional test leads and calibration resistance standards are offered for use with these DLROs.

54

DLRO10HD Dual Power 10 A Low Resistance Ohmmeter

- High or low output power selection for condition diagnosis
- Rechargeable battery or line power supply, continuous operation, even with dead battery
- 10 A for 60 seconds, less time waiting to cool, great for charging inductance
- High input protection to 600 V, inadvertent connection to line or UPS voltage will not blow a fuse
- Heavy duty case: IP 65 lid closed, IP54 operational (battery operation only)
- Rotary switch selects one of five test modes, including auto start on connection, giving ease of use

The DLRO10HD is powered from either its rechargeable battery or line power making it suitable for continuous testing in production line/repetitive use environments. This unit provides enhanced compliance and is capable of delivering 10 A into measurements up to 250 m Ω and 1 A into measurements up to 2.5 Ω . The duration of each test may be up to 60 seconds.

The DLRO10HD is rated CAT III 300 V. A range of test leads is available to suit the application and provides five test modes each of which is selected through a simple rotary control.

55

MJÖLNER 200 Microhmmeter

- Designed for measuring contact resistances of circuit breakers, contacts, disconnect switches, bus-bar joints, and other high current links
- Ability to store test results
- Output current to 200 Amps
- Built in thermal printer
- PC interface connection
- Safer testing using DualGround™ technology

With MJÖLNER 200 it is possible to make measurements according to the DualGround method. This means that the test object will be grounded on both sides throughout the test giving a safer, faster and easier workflow.

MJÖLNER 600 Microhmmeter

- Same easy-to-use front panel operation
- The MJÖLNER 600 can output 300 A continuously when required
- Weight is 25lbs lighter than legacy microhmeters

56

MOM200/600A Microhmeters

- Measures contact resistance in circuit breakers, disconnecting switches, busbar connections, safety devices, etc.
- Easy to operate
- Designed for rugged field use
- Highly flexible cable connections

These models are designed to check and measure contact resistance in high-voltage circuit breakers, disconnecting switches (isolators) and busbar joints. The MOM200A is an excellent choice when 200 amperes or less are needed for measurement.

MOM600A is ideal for finding poor connections since it can put out 600 A. A range extending from 4 to 20 milliohms makes it ideal for measuring many different types of connections.

57

DLRO®200-115 Digital Microhmmeter

- Small and weighs less than 33 lbs
- Onboard memory for up to 300 test results
- Test currents from 10 A to 200 A dc
- Filtered output
- Supplied complete with 16.4 ft (5 m) test leads and download software

Megger DLRO200-115 measures resistances between 0.1 $\mu\Omega$ and 1 Ω at high currents. A large liquid crystal display provides clear viewing of entered data and results.

This versatile instrument can provide test currents from 10 amps up to 200 amps, subject to load resistance and supply voltage. For applications that demand a smooth dc current, the DLRO200-115 has extra filtering on the output to reduce mains frequency ripple and can drive 200 amps through a total current loop resistance of 11 milliohms. The filtered output of the DLRO200-115 also eliminates magnetic transients that could inductively trip a breaker's control (bus differential relay) if left in the test circuit.

You can automate test data acquisition and instrument control by using **PowerDB Software** (see page 16).

58

DLRO®600 Digital Microhmmeter

- Small and lightweight at less than 33 lbs
- $\mu\Omega$ best resolution
- On-board memory for 300 test results and notes
- RS232 port to download stored results
- Supplied complete with 16.4 ft (5 m) test leads and download software

The DLRO 600 measures resistance between 0.1 $\mu\Omega$ and 999.9 $\mu\Omega$, at high currents. This versatile instrument can provide currents from 10 A to 600 A. The high current capability and compact design makes this instrument suitable for testing circuit breaker contacts, switch contacts, busbar joints or other applications where high current is needed.

You can automate test data acquisition and instrument control by using **PowerDB Software** (see page 16).

59

DLRO-H200

- Bluetooth headset for audible pass/fail testing against adjustable limits
- Up to 240 Amps
- Battery supplied
- Lightweight – 2.2 lbs
- Bluetooth® PC communication

The DLRO-H200 is designed to measure the resistance of circuit breaker contacts, bus-bar joints and other high-current links. This product is designed with safety, ease of use and versatility in mind.

This Micro-ohmmeter can be used anywhere to measure a low resistance value with high accuracy.

With DLRO-H200 it is possible to make measurements according to the **DualGround™ Method**. This means that the test object will be grounded on both sides throughout the test giving a safer, faster and easier workflow.

60

STVI - Smart Touch View Interface Handheld Controller for SMRT and MPRT Test Sets

- Large High Resolution Color TFT LCD touch-screen intuitive smart navigation makes testing relays easier
- Designed for either right or left handed operation with control knob centrally located
- Automatic Ramp, Pulse Ramp, and Pulse Ramp Binary Search Capability for pick up and dropout tests
- Overcurrent Relay Test includes IEC, IEEE and hundreds of built-in Specific Relay Time-Curves

The Smart Touch View Interface™ (STVI) is Megger's second generation of handheld controllers for the new SMRT and older MPRT¹ relay test systems. The STVI, with its large, full color, new high resolution, and high definition TFT LCD touch screen allows the user to perform manual, steady-state and dynamic testing quickly and easily using the Manual or Sequencer test screens, as well as using built-in preset test routines for most popular relays.

61

SMRT1

- Single Phase High current, high power up to 75 Amps/400 VA rms)
- Small, rugged, lightweight and powerful
- Operate with or without a computer
- Intuitive manual operation with Smart Touch View Interface
- Network interface provides IEC 61850 test capability
- Fully automated testing using AVTS Software

Using the Ethernet ports, SMRT1 is literally a "plug-and-play" unit, where voltage and current outputs can be seamlessly synchronized with other SMRT family of units voltage and current outputs for testing more complex relays.

62

SMRT36

- High current, high power (60 Amps/300 VA rms) per phase
- Small, rugged, lightweight and powerful
- Operate with or without a computer
- Intuitive manual operation with Smart Touch View Interface
- Network interface provides IEC 61850 test capabilities
- Fully automated testing using AVTS Software

For size, weight, and features the SMRT36 is conceivably the smallest, lightest, highest output powered, complete three phase relay test system in the world today. The test system may be customized by adding the number of Voltage-Current, "VIGEN", modules needed for specific test applications. For electric utility use, the SMRT36 with three VIGEN Modules provides complete three-phase testing of three-phase impedance, directional power, negative sequence overcurrent and other devices that require a three-phase four-wire wye connected source. With three modules, output current and VA is tripled for high instantaneous or high burden overcurrent relays. With the voltage channels converted to currents, the same unit can provide 6-phase current. The SMRT36 VIGEN modules also provide high power in BOTH the voltage and current channels to test virtually all relays.

63

MPRT8445 Protective Relay Test System

- Open communication architecture for third party software applications
- Increased output current and power of 45 amps at 300 VA per phase
- Improved low current accuracy
- Convertible voltage channel rated at 15 amps
- IEC-61850 Test Capabilities
- New Smart Touch View Interface (STVI), with large Color TFT LCD touch screen display
 - Enhanced Graphics and intuitive Navigation
 - Built-in Test Report generator
 - New Dynamic Testing tools
 - Connection via Standard Ethernet Cable
- Weight reduction of up to 15%

The 'Power Box' is ultra flexible, rugged, lightweight and feature packed. Features include:

- New Constant Power Output current amplifier provides high power 300 VA per channel to test virtually any relay
- Built in transducer testing capability

Manual testing with no computer required.

- STVI - Smart Touch View Interface for easy manual testing
- Unique hand-held, large, full color touch screen provides intuitive step through operation of the controller
- All outputs are metered and displayed during test
- Stores test configurations and test results

Automated/computer control software testing provides:

- On-line Vector, Ramp and Click-On-Fault controls
- Multiple test wizards are provided including a step-by-step routine for performing the following tests: overcurrent, over/under voltage, frequency, differential, distance, synchronizing and directional
- Import, save and execute relay test modules
- Calculates fault values for phase-to-phase, phase-to-neutral, and 3-phase faults

64

AVTS (Advanced Visual Test Software)

- Three levels of operation – Basic, Advanced, Professional
- Ability to communicate with relay while testing via Modbus or VB Script – pulls in relay setting prior to test, and tests relays to settings
- Fully automated testing for popular complex relays – dramatically reduces the test time and learning curve prior to testing
- Recorder Capability – review output waveforms and binary input/outputs without expensive external equipment
- Complex manual testing via computer includes:
 - Dynamic control
 - Online ramp control
 - Online vector control
 - Click-on fault control
- RIO Import capability allows testing of specific relays via provided with RIO file formats

65

AVTS Relay Test Modules

- Complete, ready-to-use relay test modules for both electromechanical and microprocessor based relays
- Over 100 different test modules to choose from covering the most popular relays made by GE, Schweitzer, ABB/Westinghouse, Siemens, Beckwith and Basler
- Modules are designed to completely test the relay to individual manufacturer specifications

AVTS Relay Test Modules can eliminate the time and cost associated with creating individual relay test routines. Test modules run in AVTS Software Version 4.X. AVTS Basic users can import AVTS modules and execute, save and print results. AVTS Advanced users can copy, paste, rename and modify existing AVTS modules to create new tests with similar operating characteristics. AVTS Professional contains all of the above features, plus special testing and editing tools for even more flexibility.

66

FREJA 300/306

- Operate with or without a PC
- Calibration box for easy calibration
- Generated values shown on local display
- FREJA 300 - 3 current channels
- FREJA 306 - 6 current channels

The FREJA 306 is a computer-aided relay testing and simulation system. The rugged hardware design is built for field use over a wide temperature range with the possibilities of intelligent software to perform rapid testing. FREJA 306 can also be used as a fault simulator and create and generate simulated faults, or import actual recorded faults.

67

SVERKER 750/780 Relay Test Sets

- The engineer's toolbox for all single phase relay testing
- Stand-alone functionality
- Rugged and reliable for field use

The SVERKER 750/780 features many functions that make relay testing more efficient. For example, its powerful measurement section can display (in addition to time, voltage and current) Z, R, X, S, P, Q, phase angle and $\cos \phi$. The voltmeter can also be used as a 2nd ammeter (when testing differential relays for example). All values are presented on a single easy-to-read display.

You can also test directional protective equipment efficiently by means of the built-in variable voltage source. In SVERKER 780 this has a continuous phase shift function and adjustable frequency as well. Automatic reclosing devices can also be tested – just as easily.

68

SVERKER 650

- High current/high power output
- Lightweight, portable and designed for rugged field use
- 0 to 100 Amp output current
- Suitable for testing many different types of relays such as power, voltage and current
- Optional SVERKER WIN Software for automated testing available

The Sverker 650 is used in high-voltage substations and industrial environments. The built-in capacitor provides phase shift when testing directional protective relays, a set of resistors can be used to divide voltages. It is compact, powerful and provides all of the functions needed for secondary testing of almost all types of single-phase protection now available on the market.

The Sverker 650 is intended primary for secondary injection testing of protective relays. Virtually all types of single phase protection can be tested.

69

PMM-1 Power Multimeter

- Simultaneous measurement and display of all 3-phase system parameters
- Accurate phase angle measurement at low current levels
- Versatile, menu-driven instrument

The PMM-1 is a portable, battery or line operated, multi-function measuring instrument designed to measure ac primary and secondary currents, voltage power, reactive power, phase angle and frequency of single and three-phase systems. A high-speed recording feature can capture starting currents of three-phase motors. All measured values are displayed on a large, easy-to-read graphic display. RS-232 data and parallel printer ports are provided.

70

PAM360E

- Designed for use in substation or industrial environments
- Compact, lightweight and easy to use
- Switchable input between current and voltage
- Economically priced

The Programma Model PAM360E Digital Phase Angle Meter is specifically designed for measurements on electrical power systems. Model PAM360E is commonly used for phasing out circuits, checking poly-phase metering installations, testing and calibrating protective relays, checking differential relay schemes, and verifying the polarity of current and potential transformers.

71

NEW PFL22M1500 Portable Cable Fault Location System

- Portable, rugged fault locating systems
- HV insulation testing to 20 kV
- Proof/burn up to 20 kV, 115 mA
- 8/16 kV, 1500 Joules surge output
- Arc reflection method
- Arc reflection plus
- Differential arc reflection
- Impulse current (current impulse)
- Integrated large screen color TDR
- Optional onboard inverter

The Megger PFL22M1500 Power Cable Fault locator is designed to provide quick, effective, accurate and safe fault location, thereby reducing system outages and minutes lost.

The instrument comes in a rugged yet portable enclosure. Its IP64 rating makes it suitable for use in even environmentally hostile conditions.

72

PFL40A Series Constant Energy Power Cable Fault Locating System

- Compact, portable fault locating system
- Proof (DC) testing to 40 kV
- High-voltage surge to 34 kV
- 8/16/34 kV, 2000 Joules surge output (4 kV 1500 Joule range optional)
- Integrated MTRD/Analyzer offers multiple fault locating techniques
 - Arc reflection
 - Current impulse
 - Voltage decay

The PFL40A is a powerful complete cable fault locator. The system is a "constant energy type," providing maximum energy to pinpoint faults while at low voltage, minimizing the voltage stress on service-aged cables. The PFL40A offers multiple pre-locating techniques to further reduce the number of thumps required to pinpoint faults. The PFL40A reduces the amount of time it takes to classify, pre-locate and finally, pinpoint faults on cables.

The PFL40A is employed on URD systems (direct burial) or duct bank/vault topologies. The 2000-Joule unit easily has enough energy to pre-locate and pinpoint on PILC (belted) feeders and small PILC networks.

The unit has many features such as continuously variable voltage control and a proof testing timer. It has emergency stop and a ground monitor interlock system.

73

NEW MPP2000 Pinpointer

- Universal pinpoint fault location system
- Ergonomic, rugged, weather resistant case
- Electromagnetic, acoustic and time delay fault location methods
- Displays magnetic and acoustic signal levels
- Displays relative distance and direction to the fault
- Large backlit LCD
- Background interference suppression using selectable filters

The Megger Pinpointer model MPP2000 is specifically designed to accurately and quickly pinpoint faults in underground cable networks. Easy-to-access menus provide advanced users the flexibility and features they desire.

The MPP2000 is housed in a lightweight, ergonomically designed, rugged case that is IP54 rated. The unit can be easily carried "hands free" using the adjustable neck strap. In addition, the instrument can be used with any manufacturer's surge generator (thumper).

74**Electromagnetic Impulse Detector**

- Indicates direction of fault
- Works under all weather conditions
- Converts to voltage gradient tester with optional earth frame

The electromagnetic detector system is used primarily to localize faults on cable buried in conduit. It may also be used to localize faults on non-buried and direct-buried cable.

When used with the optional surface coil, it is also possible to trace cable. When used with the optional earth frame, it is possible to pinpoint faults on direct-buried cable.

75**L1050 Portable Fault Locator**

- Multiple output frequencies
- High power at low frequency
- Superior receiver filtering

A lightweight, one-piece design, the L1050 offers the flexibility of reaching difficult, multipoint, grounded utility locating applications. High 82 kHz frequency path allows locating past bad telephone bonds, locating underground stubs and permits inductive locating with either the optional flexible coupler or through direct soil induction.

76**L1070 Portable Fault Locator**

- Passive 60 Hz detection serves as an excellent safety feature
- Multiple transmit/receive frequencies provide accurate long or short range locates
- SONDE support

Capable of locating long or short ranges, inductive or conductive, active or passive, the L1070 and L1071 deliver quick and accurate results with a user-friendly interface. A special design feature on both units allows the selection and comparison of receiver information on two frequencies simultaneously without having to return to the transmitter. The portable locator also features SONDE detection and locating. By selecting this feature, the user is able to choose a SONDE that will match the same frequency and the receiver.

77**Suitcase Impulse Detector**

- Simple, maintenance-free operation
- Compact design
- Noiseless discharge technique

The Suitcase Impulse Detector is a lightweight and portable fault-locating set that can be carried easily by one person and is effective on cables rated up to 15 kV. A stepped impulse voltage selector enables the operator to choose output levels of 3, 6, 9, 12 or 15 kV.

78**Arc Reflection Filters**

- Choice of standard or heavy-duty models
- Delivers highest energy levels to the fault
- Designed for safe, continuous operation

Megger arc reflection filters aid in locating faults on power cables rated at up to 35 kV. Most URD systems are easily tested with a standard filter, while the heavy-duty arc reflection filter is used whenever the system generates over 1,000,000 Joules/hour and/or 70-kV proof/burn voltage.

15-kV Portable, Dual-Voltage and Heavy-Duty Impulse Detectors

- Three models to choose from
- Engineered to assure optimum operator safety
- Locates faults by the high-voltage impulse method

79

15-kV Portable Model: for lightweight economy, this 75 lb (34 kg) instrument discharges 563 Joules at 15 kV.

80

Dual-Voltage Model: this constant energy unit features dual voltages to permit up to 450 Joules to be discharged over both a 7.5 and 15 kV range. On the 7.5 kV range this unit utilizes a 16 µF capacitor which produces a loud "thump" at the fault.

81

Heavy-Duty Model: with its 3,750 or 7,500 Joule at 25 kV impulse voltage output, this unit can find faults on 35 kV class direct buried cable or in conduit or duct. The 65 kV proof mode permits acceptance testing of 15 kV class cable and maintenance testing of 25 kV class cable.

82**PHAZER**

- True three-phase and single-phase testing capabilities
- Fully automatic operation
- Quick Action Socket opens automatically
- Built-in Watt-hour, Var-hour, Q-hour and VA-hour testing capability is standard
- Test watthour meters with installed Turtles®
- 32-bit operating software – for use with Windows® 95, 98, 2000, ME, NT 4.0, XP and Vista™
- State-of-the-art optical sensing
- Models available for testing socket-mounted meters as well as panel-mounted and bottom-connected meters

The Phazer Watthour Meter Test Systems are all true, three-phase automatic test sets. Included with each Phazer is our powerful new 32-bit software which now allows the user to perform all power measurements such as Watt-hours, Var-hours, Q-hours and VA-hour testing. State-of-the-art optics can monitor reflect, infrared, LCD, LED or through-hole meters with no adapters needed.

83**PA-2505K**

- Full-scale range simultaneously selected by current-range selector switch
- Eliminate need to change leads
- Selectable 50% or 100% power factor
- Test single or polyphase watthour meters

The rugged PA-2505K Phantom Load is designed for field-testing single-phase and polyphase watthour meters at 50 and 100% power factor and operates from a single-phase source. The PA-2505K Phantom Load is used to provide a controlled source of current for testing watthour meters. The unit is rated for continuous duty with forced-air cooling provided by a built-in fan. Primary and secondary test leads are furnished as standard equipment.

84**E-Z Test™ 9980 Series**

- Standard of the industry
- Designed to increase safety
- Simplified testing of socket-type watthour meters
- Safe, convenient and efficient way to test virtually all socket-type meters
- Unique, simplified connection system

The 9980 Series E-Z Test Meter Test Jacks are designed to increase safety and to simplify testing of socket-type watthour meters. They feature dead-front construction and a unique, simplified connection system. Four types are available for safe, convenient and efficient field testing of virtually all commonly used socket-type meters.

Molded from a tough, glass-impregnated polycarbonate, E-Z Test Meter Test Jacks will withstand the rigors of daily field use.

85**PA-9 Plus 9-Channel Recorder**

- Complies with all applicable IEC, IEEE, EN Standards and CE marking
- On-site analysis and data retrieval without a computer
- Intelligent download – select only the data required
- 9 channel: 4 voltage and 5 current channels
- Includes Metrossoft® Software

The PA-9 Plus is the ideal tool for monitoring and recording power quality, power flow and equipment start-up. This instrument trends imbalance, individual harmonics, THD and TDD. Other features include 12 mb of non-volatile internal flash memory storage, an optional removable flash memory card and the ability to preview reports and charts by sequence and download only what is required.

86**PA9 Wireless**

- Wireless modem/internet accessible
- A ruggedized, full-featured instrument measuring to worldwide PQ standards
- Wireless modem allows for remote analysis and retrieval of data, and remote unit configuration
- Trends voltage, current, imbalance, power, energy, events, flicker (PST/PLT), THD, TDD, individual harmonics, and frequency
- Real-time, graphical display of harmonic content, power and source direction
- Intelligent download—preview and retrieve only the information of interest
- Remote communications and alarming capabilities
- Includes enhanced MEGPA9IEC software
- 9 channel: 4 voltage and 5 current channels

The PA9 Wireless is the latest innovation of the successful PA-9 Power Quality Analyzer platform. It incorporates newly enhanced key features including a wireless modem for remote communication, a full 12 MB of nonvolatile internal memory and standard auxiliary power input capabilities as well as an optional external flash card for added memory.

The wireless modem allows the user to configure the unit remotely and view real-time data via the remote screen, as well as preview all recorded data without downloading the data. The user can then choose what data they wish to download.

87**SLM-8, 8-Channel Recording Volt-Ammeter**

- Quick setup, immediate analysis
- Self-power operation
- 3-phase voltage, current, loose neutral detection, sag and swell detection as well as flicker recorder
- Optional PCMCIA card/memory

The SLM-8 is a low cost, 8-channel paperless recording volt-ammeter used for measuring and recording the true RMS values of up to four voltage channels and four current channels. The instrument measures and records three-phase voltage and current as fast as every 6 cycles, with a 1 cycle response time.

88**MR-4 Meter Adapter Recorders**

- Detects sags, swells, sub-cycle events, THD events, loose neutrals and flicker
- Ideal for split-phase residential and light commercial investigations
- Records Voltage, Current, Power, Energy, Harmonics and Voltage Regulation Data
- Installs quickly and safely, no exposed wiring

The MR-4 provides a powerful tool to track power quality problems in homes and offices. The instruments are digital recorders completely contained in a standard universal ring or ringless type meter adapter. The MR-4 uses a very high speed DSP sampling at 256 samples/cycle, providing measurements that are true RMS beyond the 50th harmonic.

89**WinReport - MR-4 Data Analysis Software**

- Automatic Data Analysis of recorded MR-4 data files
- Generates custom report in Word complete with logos and text
- Download the data from the unit and with 3 clicks of the mouse WinReport lets you see where the trouble is

WinReport is an extremely powerful, stand alone software that analyzes MR-4 data and creates custom reports in Word®.

90**MDP Series**

- Choice of three models that record currents up to 1000 amps, with an additional 200 amp over-range
- Waveform capture and harmonic analysis up to the 32nd order
- Power factor/power, KW, KVAR and KVA
- Accurate data capture via advanced MDP software

The Megger MDP series of distribution profilers provides power utilities with the most accurate and extensive information ever to precisely evaluate loading on feeders/overhead lines and to identify needed upgrades or replacement. Three different models range from a simple "current-only" version to the most advanced unit that offers a number of market-requested features. Each MDP can be easily upgraded to the next model at any time.

91**MetReport - Data Analysis software**

- Automatically analyze your data files. Save hours of time.
- A powerful report generation tool for Megger Power Quality Analyzers
- An integrated wizard function included for simplicity
- Output completed reports into a standard Microsoft Word® Document
- Customized pass/fail reporting and criteria

MetReport is an extremely powerful, fully functional, stand-alone report generation tool for the PA-9, PA-9Plus and PA9 Wireless instruments. Its primary purpose is to save time and effort. This is done by automatically analyzing the data and creating reports complete with logos and text.

92**STATES FMS Semiflush-Mounted Test Switches**

- Select from 1-10, 1-14, 1-30 or choose any combination of switches (also available in a 19" rack configuration)
- Safe, durable, rugged and reliable
- Choice of black or clear covers with provision to apply seal
- UL Listed and CSA certified

The STATES FMS Test Switch provides a compact, versatile means to disconnect, test or measure devices and circuits in panelboards such as relays, metering, control circuits and other instrumentation applications. The switch works without instrument transformers being disconnected from secondary wiring.

Other popular STATES Test Switches (MTS, SJK, SMH) are used to simplify the testing on control circuits, instruments, transducers, meters, relays and other electrical equipment, and are available in a variety of configurations, sizes and styles.

93**STATES Single Current Test Probe (Model 15000)**

Used in configuration with the current shunt jack on STATES Test Switches, this probe provides a safe, quick connection for indicating or testing instruments without opening CT secondaries or disturbing permanent wiring. The probe is easily inserted at right angles to the test switches.

94**STATES Test Paddles**

- 10 and 14 pole configurations
- Ergonomically designed handle, use only one hand to connect to test switch
- Labeled 4-way connectors to locate connector to corresponding switch
- Used for STATES FMS Test Switches and ABB FT-1 10 pole Test Switch

The STATES 10 and 14 pole potential test paddles are feature packed and have been designed to make a test technician's job easier.

For additional ways to connect to the V1TP10, purchase the TPA10 test paddle attachment, shown in photo to the right.

To view complete product datasheets, go to www.megger.com/us and click on "Products."



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AVO Learning Centers

AVO has offered training to thousands of electrical maintenance, safety and testing technicians and engineers around the world since 1963. Our Dallas, Texas Learning Center is adjoined by a 2-acre power cable and grounding field and outdoor substation. It is equipped with classrooms, an indoor substation, motor control center, equipment lab, and protective relay and circuit breaker hands-on labs stocked with the type of equipment you use at your facility.

Our Learning Center in Valley Forge, Pennsylvania, is complete with an indoor substation, relay and circuit breaker labs, classrooms and an outdoor cable and grounding field. AVO classes are also offered across the United States including California, Florida, Kentucky, Maryland, Massachusetts, Missouri, Nevada, New York, Ohio, Oregon, Pennsylvania, Texas, Tennessee and Utah.

Hands-on

AVO believes hands-on training is the best method to ensure students learn the skills needed to properly perform their job and tasks. Our instructors have extensive “on-the-job” training with a minimum of ten years of field experience teaching students in a controlled laboratory – simulating their work environment and ensuring maintenance is being properly and safely performed. Each of our courses includes enough theory and hands-on application to enable students to understand how a device operates and how to test and maintain similar devices.

On-site

On-site training is the most cost effective way to train your employees when you have several to train. On-site training allows your employees to work as a team solving issues at their facility and on their equipment. AVO supplies the expert instructor, training materials and supplemental equipment. You tell us where you want it, when you want it and how you want it!

Tailored Courses and Custom Curriculum Development

Choose from any of our standard courses or have a course tailored for your company. You could even have an entire curriculum system custom developed based on your needs - the choice is up to you.

Certification

Our Technician Certification Programs are based on national regulations, standards and requirements as well as manufacturer’s recommendations. Each program requires the successful completion of the lecture/hands-on classes as well as written exams. Certification is valid for three years.

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AVO’s Electrical Engineering Services specializes in complete power system analysis. This includes Arc-Flash Hazard Analysis and engineering and safety solutions to mitigate high levels of incident (arc) energy. Our team of licensed professional engineers is dedicated to providing a safe working environment for your employees as well as reliability of your electrical power systems and equipment.

Electrical Safety Services

AVO’s Electrical Safety Services will help you protect your employees and reduce your incident and accident rates! AVO will perform a complete assessment of your electrical systems, equipment and safety programs, providing you a written report with recommendations.



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